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means 426 and fluid exit means 427. Such heat exchangers could be made of a material having high conductivity, including ceramics such as silicon carbide or perhaps silicon nitride or metals such as the nickel alloys, which may be such as to have catalytic effect. The heat exchanger may effectively constitute filamentary material, as described later. Alternatively, the heat exchangers may be placed elsewhere in the exhaust system of an engine, including just downstream of a reactor assembly.

JB 7/28/08

Please amend the ~~first full~~ paragraph of page ~~15~~ 16 line 25, ending on page 17 line 19 as follows: (It is to repeat a description of feature 1010 made earlier in the paragraph.)

A selected embodiment of the engine is illustrated schematically in Figure 20. It consists of a piston 1001 reciprocating between two combustion chambers 1002 at each end of a cylinder 1003 closed by two heads 1004, with a crankshaft 1006 outboard each head, the piston being connected by tensile members 1007 to both crankshafts. Optionally, the crankshaft will also function as a camshaft, actuating valves and optionally providing fuel delivery. The liquid elements for the charge may be delivered to the combustion chambers under pressures and temperatures higher than normal in conventional engines. The cylinder is at least partially surrounded by an exhaust gas processing volume 1008, with exhaust gas being conducted to the volume by alternate paths 1005 and 1009. Intake to the combustion chamber is via the crankcase. Surrounding the engine is a heavily thermally insulated casing 1010, here functioning as structure enclosing volume 1008. This configuration is suitable for four and two stroke embodiments, consuming fuel ranging from gasoline and similar lightweight fuels through diesel and heavier oil fuels to coal and other slurries or powders. Any engine lubrication and / or bearing system may be employed, but optionally either gas or roller needle bearings are used, perhaps with water or other liquids, in the case of water preferably when the components are of ceramic material, as described later. The crank assembly is preferably so designed that any air bearings at least partially operate at a pressure equivalent to the charge pressure of forced induction, in the case of turbo-charged, supercharged or force-aspirated engines. In the case of two stroke engines, the preferred arrangement is to exhaust gases via ports about the center of the cylinder. In the two cycle form illustrated schematically in Figure 21, pressurized air is ducted via crankcase 1275 and valve 1276, actuated optionally by combined crankshaft / camshaft 1277, to combustion chamber 1288 (fuel injection system not shown), displacing exhaust gas which exits the chamber via ports 1289 to circumferential exhaust gas processing volume 1290. A heavily thermally insulating casing (~~Insulation~~) 1010 extends around the engine of Figure 20, and is shown around the crankcases and engine of Figure 21. In another example of either a two- or four-stroke engine, Figure 22, the schematically shown piston / cylinder module 1271 is linked to a single crankshaft 1272 by tensile elements 1273 routed about guides / bearings / rollers and / or wheels 1274.

Please amend the first full paragraph of page 31 as follows: (It serves to explain "blow-by".)

Blow-by occurs in all engines; it is the tubular column of gas that travels from the high-pressure combustion volume between piston and cylinder walls to a lower-pressure area below the piston. Experiments (by Timoney in Dublin in the 80's among others) have shown that a free piston, traveling at speed in a horizontal cylinder between two combustion chambers, does not make contact with the cylinder walls. It is supported by the high pressure gas blow-by, effectively a gas bearing.